

ONKYO® SERVICE MANUAL

SYNTHESIZED FM STEREO/AM TUNER MODEL T-4040



Black model

BMDN	120V AC, 60Hz
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SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK $\triangle$ ON THE SCHEMATIC DIAGRAM AND IN THE PARTS LIST ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE THESE COMPONENTS WITH ONKYO PARTS WHOSE PARTS NUMBERS APPEAR AS SHOWN IN THIS MANUAL.

MAKE LEAKAGE-CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

ONKYO®
AUDIO COMPONENTS

SPECIFICATIONS

FM

Tuning range:	87.50 – 108.00 MHz (50 kHz steps)
Usable sensitivity	
Mono:	11.2 dBf, 1.0 μ V, 75 Ohms, IHF 0.9 μ V, 75 Ohms, DIN
Stereo:	17.2 dBf, 2.0 μ V, 75 Ohms, IHF 20 μ V, 75 Ohms, DIN
50 dB quieting sensitivity	
Mono:	16.1 dBf, 1.7 μ V, 75 Ohms
Stereo:	36.1 dBf, 17 μ V, 75 Ohms
Capture ratio:	1.5 dB
Image rejection ratio:	40 dB
IF rejection ratio:	90 dB
Signal-to-noise ratio	
Mono:	73 dB, IHF
Stereo:	66 dB, IHF
Alternate channel attenuation:	50 dB, IHF
AM suppression ratio:	50 dB
Total Harmonic Distortion	
Mono:	0.1%
Stereo:	0.2%
Frequency response:	30 – 15,000 Hz ($\pm$ 1.5 dB)
Stereo separation:	40 dB at 1 kHz 30 dB at 70 – 10,000 Hz
Output voltage:	0.5 V
Muting level:	17.2 dBf, 2.0 μ V, 75 Ohms

AM

Tuning range	530-1710kHz (10kHz steps)
Usable sensitivity:	25 μ V
Image rejection ratio:	40 dB
IF rejection ratio:	40 dB
Signal-to-noise ratio:	40 dB
Total Harmonic Distortion:	0.8%
Output voltage:	150 mV

General

Dimensions (W $\times$ H $\times$ D):	435 $\times$ 91 $\times$ 305mm 17-1/8" $\times$ 3-9/16" $\times$ 12-1/2"
Weight:	3.6Kg , 7.9lbs

Specifications and features are subject to change without notice.

SERVICE PROCEDURES

1. Memory preservation

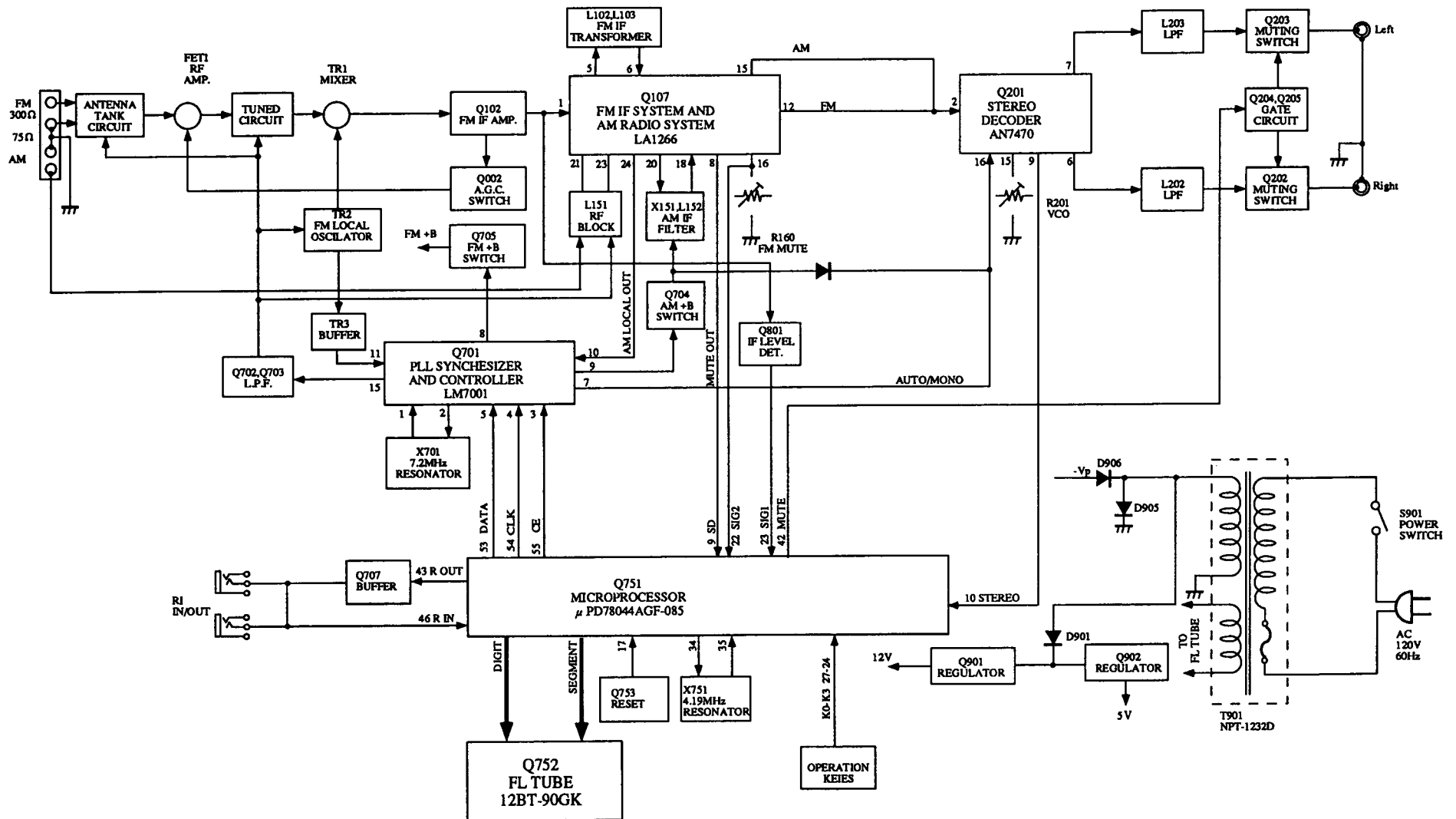
This unit does not require memory preservation batteries. A built-in memory power back-up system preserves contents of the memory during power failures and even when the unit is unplugged. The unit must be plugged in and the power switch turned on and off once in order to charge the back-up system. Note that since this is not a permanent memory, the power switch must be turned on and off a few times each month to keep the back-up system operative. The period of time during which memory contents are preserved after power has last been turned off varies depending on climate and placement of the unit. On the average, memory contents are protected over a period of 3 to 4 weeks (a minimum of 2 weeks) after the last time power has been turned off. This period is shorter when the unit is exposed to very high humidity or used in an area with an extremely humid climate.

2. Changing the band step

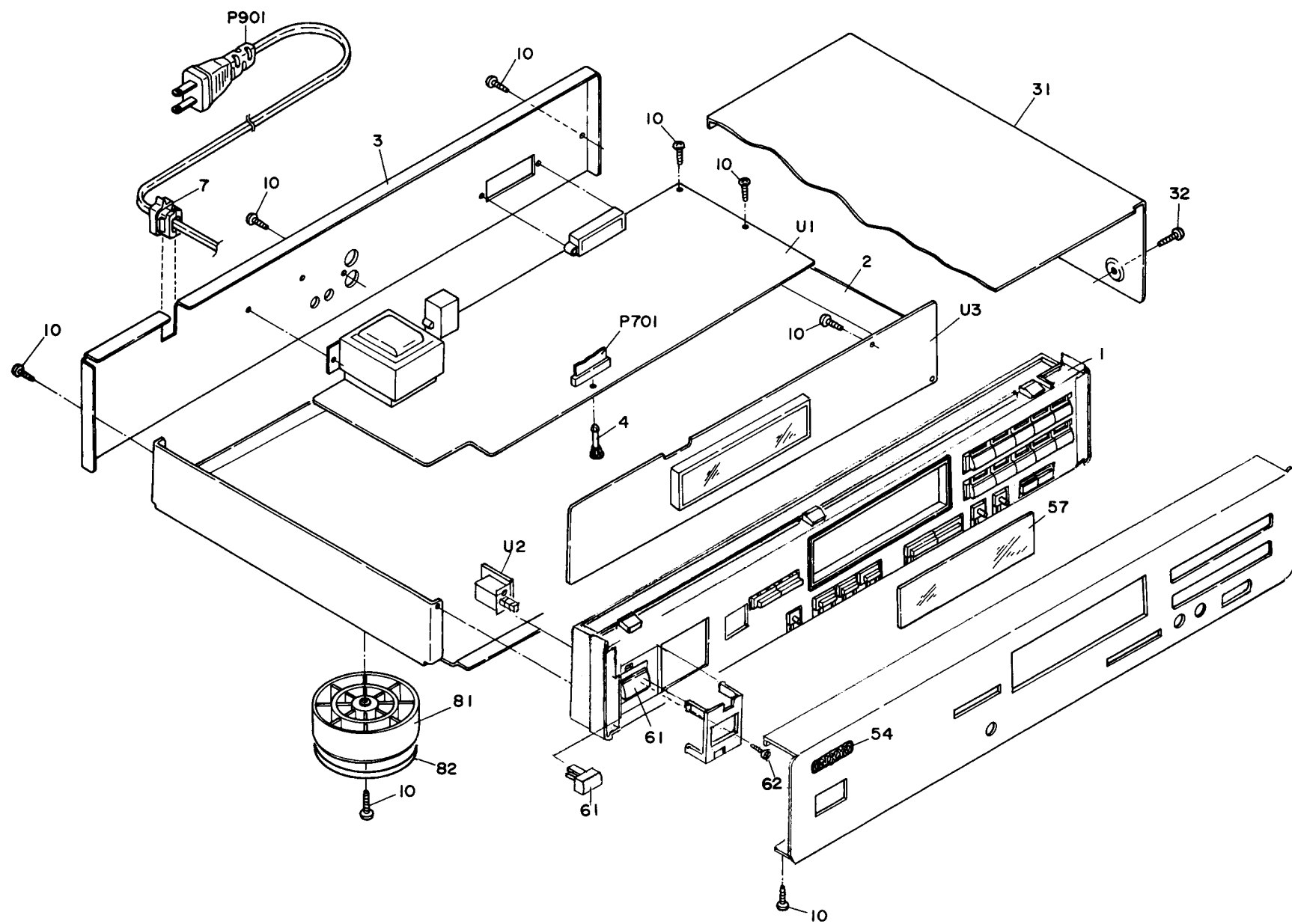
With the exception of the models below, a BAND STEP selector switch is not provided.

BAND STEP	J705
10kHz $\rightarrow$ 9kHz	Open
9kHz $\rightarrow$ 10kHz	Short

BLOCK DIAGRAM



EXPLODED VIEW

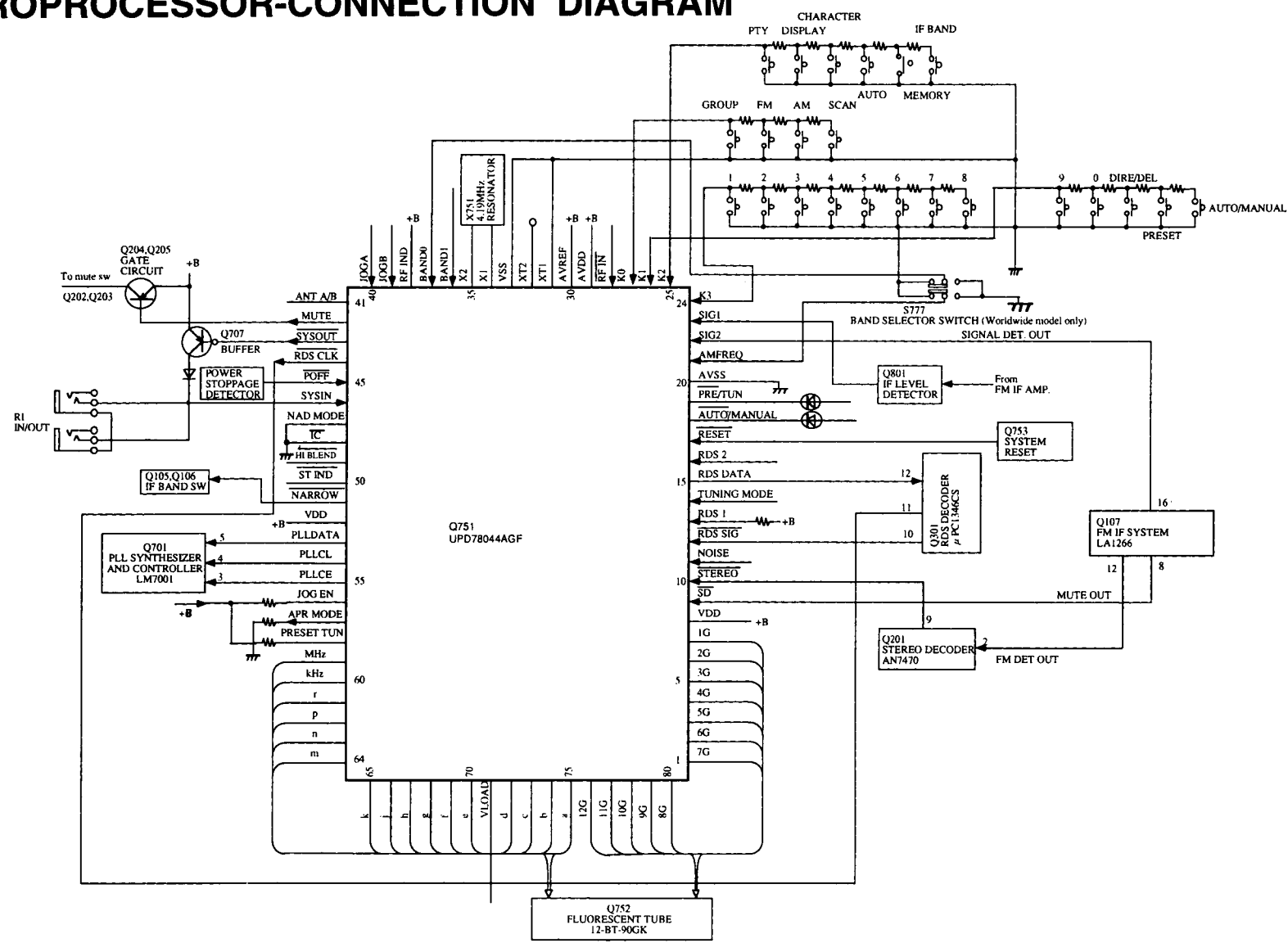


PARTS LIST

	REF.NO.	PART NO.	DESCRIPTION
	1	27110993	Front bracket
	2	27100323A	Chassis
	3	27122326Y	Rear panel
	4	27190511	KGLS-16RF, Holder
△	7	27300750	#2271, Bushing, cord
	10	838130088	3TTB+8B, Self-tapping screw
	31	28184670A	Top cover
	32	838430088	3TTB+8B(BC), Self-tapping screw
	51	27211909Y	Front panel
	54	28135244Y	Badge
	57	28191779Y	Clear plate
	61	28325465Y	Knob, power
	62	838430107	3TTB+10S(BC), Self-tapping screw
	81	27175316B	Leg
	82	28141332	Cushion
	84	260208	Wire tie
	P701	2041254012	NCFC1-240512, Flat cable
△	P901	253191HITY	AS-UC-7#18 SPT-1, Power supply cord
	U1	1A738506-1AY	NARF-6006-1A, Main circuit pc board ass'y
	U2	1A738507-1AY	NASW-6007-1A, Power switch pc board ass'y
	U3	1A738508-1AY	NADIS-6008-1A, Display circuit pc board ass'y

NOTE: THE COMPONENTS IDENTIFIED BY MARK △
ARE CRITICAL FOR RISK OF FIRE AND
ELECTRIC SHOCK. REPLACE ONLY WITH
PART NUMBER SPECIFIED.

MICROPROCESSOR-CONNECTION DIAGRAM



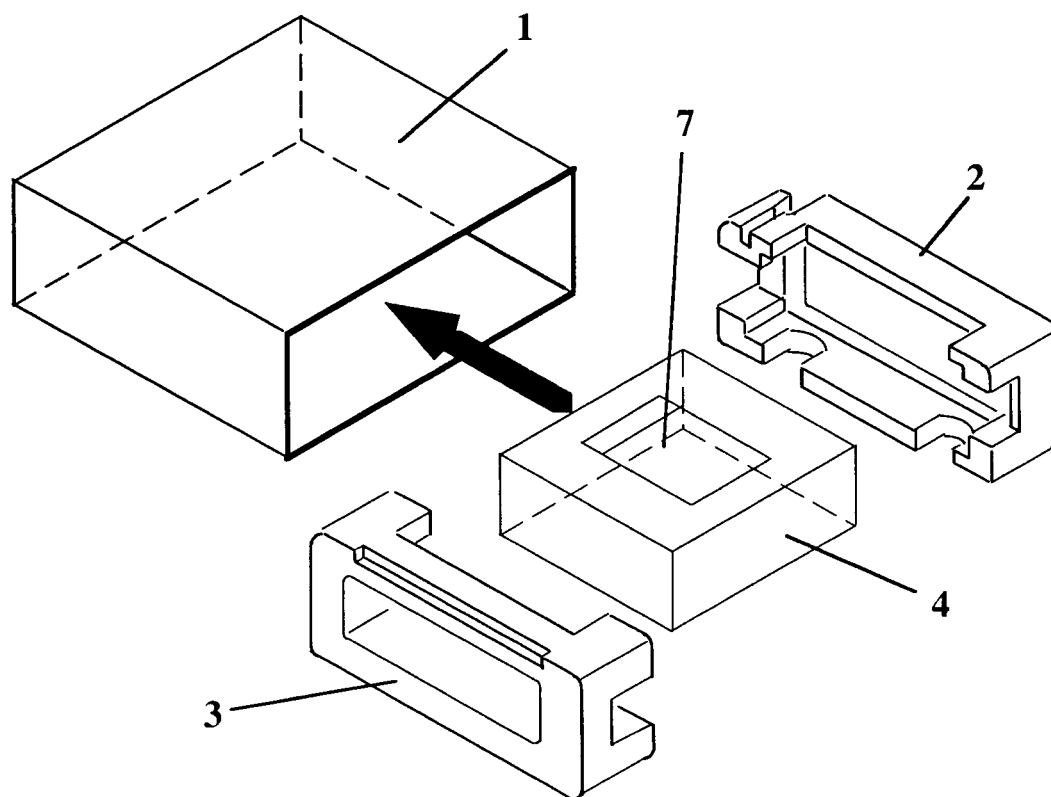
BAND 0	BAND 1	AM FREQ	Region	FM		AM	
				Frequency range	step	Frequency range	Step
0	1	0	Europe	87.5~108.00MHz	50/25kHz	522~1611kHz	9kHz
1	0	0	Worldwide	87.5~108.00MHz	50/25kHz	531~1602kHz	9kHz
1	1	1	120V model	87.9~107.9MHz	50/25kHz	530~1710kHz	10kHz
0	0	0	Japan	76.0~90.0MHz	100kHz	522~1611kHz	9kHz

MICROPROCESSOR TERMINAL DESCRIPTIONS

Pin No.	Function	I/O	Description
1-7	7G-1G	O	Grid output terminals for fluorescent tube.
8	VDD	-	Power supply terminal.
9	SD	I	Broadcast detection input more than the muting level.
10	STEREO	I	Stereo broadcast detection input
11	NOISE	I	Noise detection input
12	RDSSIG	I	RDS broadcast detection input
13	RDS1	I	Initializing input for RDS operation
14	TUNING MODE	I	Initializing input for tuning mode
15	RDSDATA	I	Connect to the terminal DATA of RDS data decoder IC μ PC1346CS
16	RDS2	I	Initializing input for RDS operation
17	RESET	I	System reset terminal
18	AUTO/MANU	O	Tuning indicator output
19	PRE/TUN	O	PRESET indicator output
20	AVSS		Ground terminal of A/D converter
21	AMFREQ	I	Initializing input for AM band step.
22	SIG2	I	Signal strength level input
23	SIG1	I	Signal strength level input
24-27	K3-K0	I	Operation key connection terminals
28	RFIN	I	RF mode detect terminal
29	AVDD		Analog power supply terminal of A/D converter
30	AVREF	I	Reference voltage input of A/D converter
31	XT1	I	Resonator terminals for sub system
32	XT2		Resonator terminals for sub system . Not used.
33	VSS		Ground terminal
34	X1	I	Resonator terminals for main system
35	X2		Connect the 4.19MHz ceramic resonator.
36	BAND1	I	Initializing input for FM band step.

Pin No.	Function	I/O	Description
37	BAND0	I	Initializing input for FM baud step.
38	RFIND	I	RF mode LED output. Not used.
39	JOGB	I	Jog dial signal B
40	JOGA	I	Jog dial signal A
41	ANT A/B	O	Ant A/B selector output. Not used.
42	MUTE	O	Muting control output
43	SYSOUT	O	System code output
44	RDSCLK	I	Connect to the terminal CLK of RDS data decoder.
45	POFF	I	Power stoppage detection input
46	SYSIN	I	System code input
47	NAD MODE	I	Initializing input for memory system
48	IC		Connect to the ground terminal
49	HI BLEND	O	Hi-blend control output. Not used.
50	ST INDD	O	Stereo LED indicator output
51	NARROW	O	NARROW indicator output
52	VDD		Power supply terminal
53	PLLDATA	O	Connect to the terminal DATA of PLL IC LM7001.
54	PLLCL	O	Connect to the terminal CL of PLL IC.
55	PLLCE	O	Connect to the terminal CE of PLL IC.
56	JOG EN	I	Initializing input for Jog operation.
57	APR MODE	I	Initializing input for APR mode.
58	PRESET TUN	I	Initializing input for PRESET tuning.
59-70	P16-P5	O	Segment output terminals for fluorescent tube.
71	VLOAD		Pull-down resistor connection terminal of FL controller and driver.
72-75	P4-P1	O	Segment output terminals for fluorescent tube.
76-80	12G-8G	O	Grid output terminals for fluorescent tube

PACKING VIEW



REF.NO.	PART NO.	DESCRIPTION
1	29053151A	Carton box
2	29091693Y	Pad (R)
3	29091692Y	Pad (L)
4	29100037-1AY	650×500mm, Styren bag
7	<Accessory bag ass'y>	
	29342430Y	Instruction manual E
	232140	NMA-3057,AM loop antenna
	292111	FM antenna
	2010244Y	Connection cord
	2010200	Remote control cord
	29365019B	Waranty card
	29358002K	Service station list
	29100097-1Y	350×250mm, Styren bag

NOTE: :Black model only
<S>:Silver model only

ADJUSTMENT PROCEDURES

Preparation

• Input

FM mono: 1kHz, 75kHz devi., 60dB/μV (65dBf)

FM stereo: 1kHz, L+R 67.5kHz devi.: Pilot signal 19kHz
7.5kHz devi.

AM: 400Hz, 30% mod.,

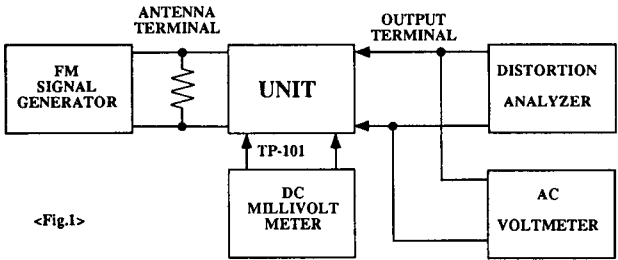
1. FM ADJUSTMENT

Item	Step	Connection of instrument	FM SG output	Stereo modulator output	Tuning frequency	Output indicator	Adjustment point	Adjust for	Remarks
FM IF/RF	1	Fig.1	99.1MHz, 1kHz 75kHz devi. 65dBf(60dB μ)	—	99.1MHz	DC voltmeter	L102	0 ± 20mV	FM MUTE/MODE switch:OFF/MONO Repeat the steps 1 and 3 until no further adjustment is necessary.
	2					AC voltmeter	IFT on the front end	Maximum	
	3					Distortion analyzer	L103	Minimum	
Muting Level	1	Fig.1	99.1MHz 1kHz 22.5kHz devi. 19.2dBf(14dB)	—	99.1MHz	Oscilloscope	R160	Signal output	FM MUTE/MODE switch:ON/STEREO
	2							No signal	
VCO	1	Fig.2	99.1MHz 1kHz 75kHz,devi, 65dBf(60dB μ)		99.1MHz	Frequency counter	R201	19,000 ± 10Hz	FM MUTE/MODE switch:ON/STEREO
Stereo Distortion		Fig.3	99.1MHz Ext. mod.65dBf(60dB)	Channel L or R 1kHz	99.1MHz	Distortion analyzer	IFT on the front end	Minimum	FM MUTE/MODE switch:ON/STEREO Don't turn more than ±90°
Stereo Separation	1	Fig. 3	99.1MHz Ext. mod.65dBf(60dB)	Channel L 1kHz	99.1MHz	Channel R AC voltmeter	R202	Minimum	Maximum and same separation
	2			Channel R 1kHz		Channel L AC voltmeter		Minimum	

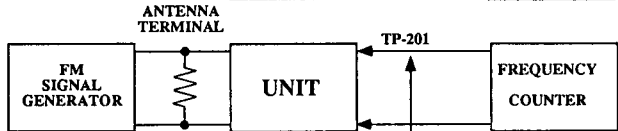
2. AM ADJUSTMENT

Step	AM SG output	Tuning Frequency	Output Indicator	Adjustment point	Adjust for
1		530kHz	Digital DC voltmeter	OSC coil on RF block L151	$1.3 \pm 0.2V$
2	600kHz 400Hz 30% mod. 60dB/m	600kHz	AC voltmeter	RF coil on RF block L151	Maximum
3	990kHz 400Hz 30% mod. 60dB/m	990kHz	AC voltmeter	L152	Maximum

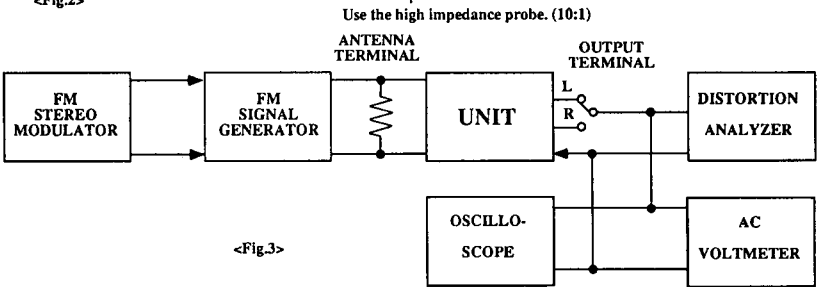
Reference Specification
FM tuned voltage: 87.5MHz~108.0MHz
 $1.6 \pm 0.5V \sim 8.0 \pm 0.5V$
AM tuned voltage: 530kHz~1710kHz
 $1.3 \pm 0.5V \sim 7.4 \pm 0.5V$



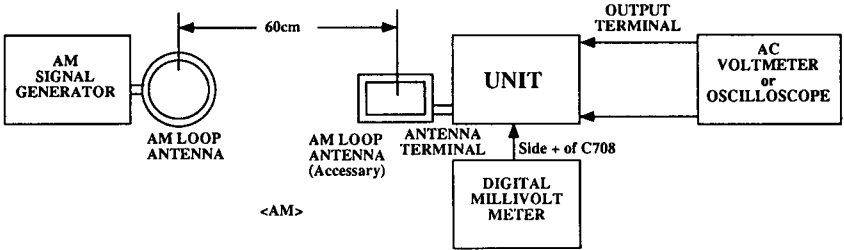
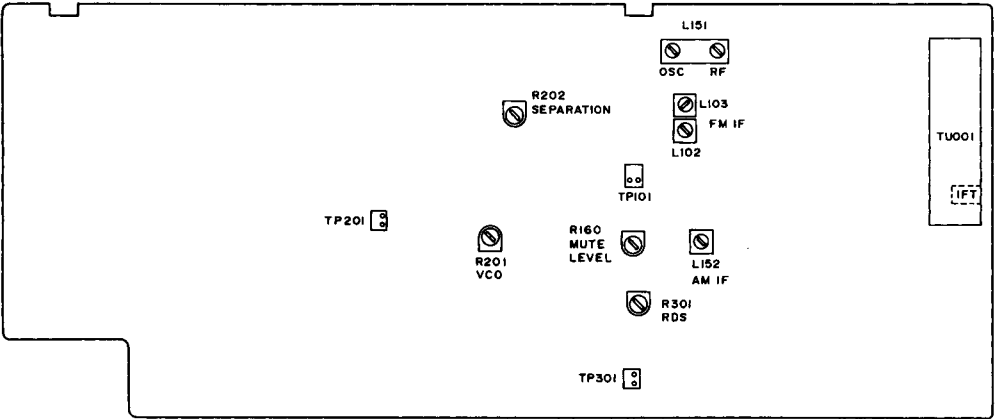
<Fig.1>

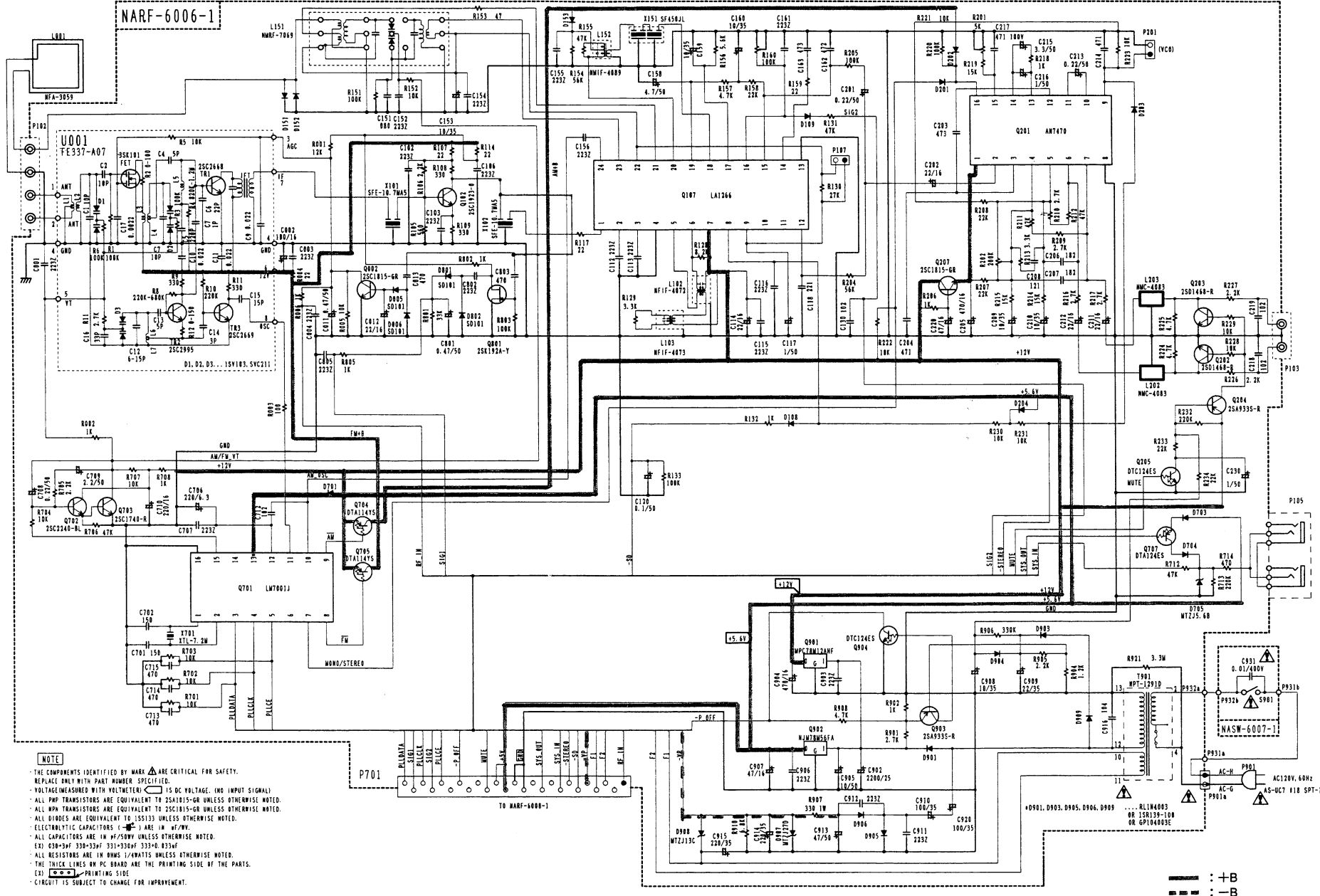


<Fig.2>



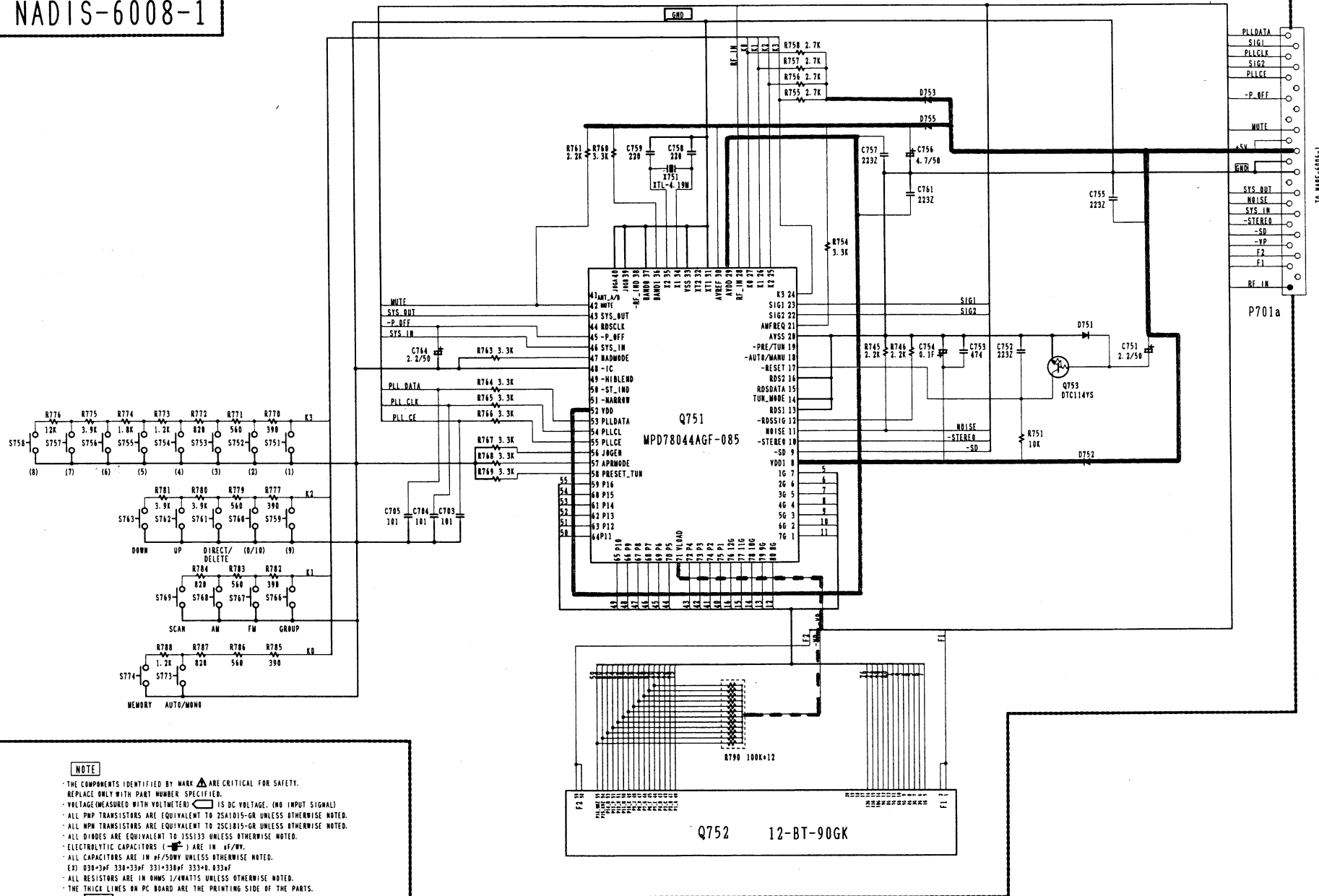
<Fig.3>





SCHEMATIC DIAGRAM

NADIS-6008-1



PARTS LIST

MAIN CIRCUIT PC BOARD (NARF-5170-1)

CIRCUIT NO.	PART NO.	DESCRIPTION	CIRCUIT NO.	PART NO.	DESCRIPTION
	Front end			Ceramic filters	
TU001	240089	FE415-G11	X101,X102	3010137	SFE-10.7MMK
	ICs		X104	3010137	SFE-10.7MMK
Q107	22240039	LA1266	X151	3010123	SFZ450JL
Q201	22240242	AN7470		X'tal	
Q301	22240679	μ PC1346CS	X701	3010158 or	XTL-7.2M
Q701	22240090	LM7001		3010141	
Q901	222780125NEC	78M12HF		Capacitors	
Q902	222780565JRC	78M56	C002	354741019	100 μ F,16V,Elect.
	Transistors		C011	354784799	0.47 μ F,50V,Elect.
Q002,Q207	2211255 or	2SC1815-GR or	C012,C114	354742209	22 μ F,16V,Elect.
Q802	2214915	2PC1815-GR	C117	354780109	1 μ F,50V,Elect.
Q102,Q103	2211723	2SC1923-O	C120	354781099	0.1 μ F,50V,Elect.
Q202,Q203	2212794	2SD1468-R	C153	354761009	10 μ F,35V,Elect.
Q204	2213074	2SA933-R	C158	354780479	4.7 μ F,50V,Elect.
Q205	2213160	DTC124ES	C159,C160	354761009	10 μ F,35V,Elect.
Q702	2211406	2SC2240-BL	C162	374724724	4700pF $\pm$ 5%,50V,Plastic
Q703	2211183	2SC1740-R	C163	374724734	0.047 μ F $\pm$ 5%,50V,Plastic
Q704,Q705	2213090	DTA114YS	C201,C213	354782299	0.22 μ F,50V,Elect.
Q707	2212600	DTA124ES	C202	354742209	22 μ F,16V,Elect.
Q801	2212274	2SK192A-Y	C203	374724734	0.047 μ F $\pm$ 5%,50V,Plastic
Q903	2213074	2SA933-R	C205	354744719	470 μ F,16V,Elect.
Q904	2213160	DTC124ES	C206,C207	374721024	1000pF $\pm$ 5%,50V,Plastic
	Diodes		C209,C210	354761009	10 μ F,35V,Elect.
D005,D006	223191	SD101	C211,C212	354742209	22 μ F,16V,Elect.
D108,D109	223163 or	1SS133 or	C215	354780339	3.3 μ F,50V,Elect.
D151-D153	223205	1SS270A	C216,C230	354780109	1 μ F,50V,Elect.
D201-D204	223163 or	1SS133 or	C217	370134714	470pF $\pm$ 5%,100V,Plastic
D301	223205	1SS270A	C220	354744709	47 μ F,16V,Elect.
D701-D704	223163 or	1SS133 or	C303,C309	374724724	4700pF $\pm$ 5%,50V,Plastic
D904	223205	1SS270A	C304	374722234	0.022 μ F $\pm$ 5%,50V,Plastic
D705	224450562	MTZ5.6B	C305	374724734	0.047 μ F $\pm$ 5%,50V,Plastic
D801,D802	223191	SD101	C306	354780229	2.2 μ F,50V,Elect.
D901,D903	22380032	1SR139-100	C307,C308	374723324	3300pF $\pm$ 5%,50V,Plastic
D905,D906	22380032	1SR139-100	C310	354741009	10 μ F,16V,Elect.
D907	224452704	MTZ27D	C706	354722219	220 μ F,6.3V,Elect.
D908	224450753	MTZ7.5C	C708	354782299	0.22 μ F,50V,Elect.
D909	22380032	1SR139-100	C709	354780229	2.2 μ F,50V,Elect.
	Coils & Transformers		C710	354742219	220 μ F,16V,Elect.
L102	233469Y	NFIF-4087	C801	354784799	0.47 μ F,50V,Elect.
L103	233470Y	NFIF-4088	C902	354752229	2200 μ F,25V,Elect.
L151	231226Y	NMRF-7069	C904	354744719	470 μ F,16V,Elect.
L152	232166Y	NMIF-4089	C905	354781009	10 μ F,50V,Elect.
L201	232164Y	NMC-4082	C907	354744709	47 μ F,16V,Elect.
L202,L203	232165Y	NMC-4083	C908	354761009	10 μ F,35V,Elect.
△ T901	2301076Y	NPT-1232P, Power transformer	C909	354762209	22 μ F,35V,Elect.
			C910,C920	354761019	100 μ F,35V,Elect.
			C913	354784709	47 μ F,50V,Elect.
			C914,C915	354762219	220 μ F,35V,Elect.
			C916	374721044	0.1 μ F $\pm$ 5%,50V,Plastic

CIRCUIT NO. PART NO. DESCRIPTION			DISPLAY CIRCUIT PC BOARD (NADIS-5172-1)		
	Resistors			CIRCUIT NO. PART NO. DESCRIPTION	
R160	5210266	N06HR 100KBC, Semi-fixed		IC	
R201	5210261	N06HR 5KBC, Semi-fixed	Q751	22240842	μ PD78044AGF-085
R202	5210267	N06HR 200KBC, Semi-fixed		FL tube	
R301	5210265	N06HR 50KBC, Semi-fixed	Q752	212140A or	12-BT-90GK, FL TUBE
R907	443623314	330ohm $\pm$ 5%, 1W, Metal oxide film		212140	
	Terminals			Transistor	
P101	25060117	NTM-2PDML051	Q753	221281	DTC114YS
P103	25045333	NPJ-2PDBL185		Diodes	
P105,P106	25045439Y	NPJ-1PDBL263	D751-D753	223163 or	1SS133 or
P701	25050965	NSCT-25P752		223205	1SS270A
P903	25051108	NSCT-4P895	D755	223163 or	1SS133 or
	Plugs			223205	1SS270A
△ P902	25055675	NPLG-2P-631		X'tal	
TP101,TP201	25055038	NPLG-2P29	X751	3010224	XTL-4.19M
TP301	25055038	NPLG-2P29		Capacitors	
	POWER SWITCH PC BOARD (NASW-5171-1)		C751	354780109	1 μ F,50V,Elect.
	CIRCUIT NO. PART NO. DESCRIPTION		C753	375524744	0.47 μ F $\pm$ 5%, 50V, Plastic
	Switch		C754	3000076	0.1F, 5.5V, Super
△ S901	25035663Y	NPS-122-L615, Power switch	C756	354780479	4.7 μ F,50V,Elect.
	Holder			Resistor	
P903a	25051108	NSCT-4P895, Wire traps	R790	49163104412	100K ohm x12, 1/10W, Network resistor
				Switches	
			S751-S763	25035664Y	NPS-111-S616, Push switches
			S766-S774	25035664Y	NPS-111-S616, Push switches
				Wire holder	
			P701a	25050889	NSCT-25P684
				Holder	
				27190953Y	FL tube

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